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HEALTH EDUCATION IN SCHOOLS IN THE METROPOLITAN HEALTH DEMONSTRATION AREA

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SAM was a mythical boy created by a class of school children and their teacher to assume the burden of the entire class, so far as personal cleanliness and health habits were concerned. The light of the vicarious Sam's countenance was usually dimmed under a dull coat of dirt. Sam frequently forgot to use his toothbrush morning and evening. Sam often stayed up too late at nights. Sam didn't drink milk. Sam refused to eat foods that were good for him. Sam wouldn't play out of doors.

And then Sam had a change of heart and complexion. The children began to imagine him as appearing each morning

a new and shining Sam, the evidence of heroic struggles with wash cloth, soap and toothbrush. Soon the class launched into a journalistic bulletin of the new Sam's daily life.

"Sam washes his face, ears and neck every morning," was the first day's illustrated entry. "Sam uses his toothbrush every day.—Sam sleeps with his window wide open.—Every morning Sameats a good breakfast of fruit, hot cereal, toast and milk.—Sam plays part of every day out of doors.—Sam likes spinach, carrots, string beans and other vegetables.—Sam sees a doctor once a year for a health examination.—Sam visits his dentist twice a year."

HOW a health education program has been developed in the public and Catholic schools in the Bellevue-Yorkville health demonstration area is discussed in the leading article of this issue. Working with the Boards of Education, the Department of Health, the public and Catholic school principals, teachers, doctors and nurses, two supervisors of health education are assisting in developing a health program that is designed to be a permanent feature of the curricula in the schools chosen for demonstration. (The Board of Education has requested that these programs be extended to other schools in the Boroughs of Manhattan and the Bronx.

In this fashion the journal of Sam's new life was chronicled and illustrated, day after day, by Sam's interested creators. By the time that the last chapter of a full health biography was closed, and its pages carefully folded together, newspaper fashion, the entire class had stored away health knowledge and had established health habits that would influence for good their entire lives. For the mythical Sam was very

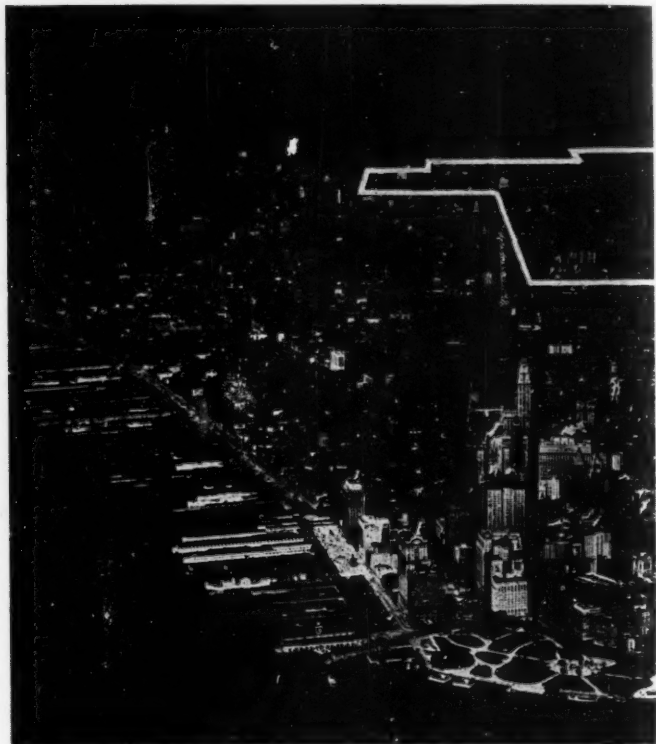
definitely made to live well and to grow sturdy under their watchful care, and the children in that classroom began to travel the paths they made for Sam, marching toward health.

A COMPARATIVE study of methods of school-room ventilation, especially in selected schools of the three centers of the New York Health Demonstrations, has been a major activity of the New York Commission on Ventilation since 1926. The manner in which these studies have been made is described in the article beginning on page 67. Activities in which the Commission has been engaged during this period are also briefly summarized. These include three laboratory inquiries which it has helped to finance—studies, respectively, of body radiation, of the effect of drafts and of atmospheric ionization.

Sam's newspaper is on exhibition at the Bellevue-Yorkville Health Demonstration headquarters at 325 East 38th Street, New York City, along with a great variety of other health education projects that have been developed within the area of influence of the Bellevue-Yorkville Health Demonstration.

The development of a health education program in the public and Catholic schools in the Bellevue-Yorkville demonstration area

is one of the major services of the demonstration. The demonstration has given to the schools two supervisors of health education, one for the thirteen public schools and one for the twelve Catholic schools in the district. Working with the Boards of Education, the Department of Health, the public and Catholic school principals, teachers, doctors and nurses, these supervisors are assisting in the development of a health education program that is designed to be a permanent, practicable and effective feature of the school curriculum. The outcome, it is hoped, will be healthy,



happy pupils and teachers, in a healthful school environment.

The plan of service in both the Catholic and the public schools in the district has been essentially the same. Before the health education activities were begun, an appraisal was made of the conditions and problems in each school, such as: the health services already available, the amount of health teaching already being done, the interest of the principal and teachers in the correction of defects, and the needs of each school.



Conferences were held with district superintendents, principals, teachers, doctors, and nurses, and each one was asked to contribute ideas and to cooperate in the development of a uniform program and policy relating to the school health education program. As a result of the early friendly contacts that were established, health education has developed as a cooperative enterprise, and from the start it has been considered as an influence which

surrounds and enters into all of the work of the day, determining habits and influencing behavior, rather than as a separate subject to be taught in the twenty-minute weekly period. The hygiene of the school room, including temperature, lighting, ventilation, orderliness and cleanliness, was one of the first considerations in the program.

Any measure of the effectiveness of an educational experiment in a public school system must take into account the attitude of the Board of Education as the experiment progresses. The Board of Education of New York City has been

interested from the beginning, and has at all times expressed its approval and appreciation of the work being done in the schools. In January, 1929, a year and a half after the beginning of the demonstration service, the Board of Education requested that the school program and its policies be extended to include other schools in the Boroughs of Manhattan and the Bronx.

This experiment in the public schools is under the direction of the director of health education. Working with him are the assistant director of educational hygiene and the health education supervisor of the demonstration for the public schools, who is now also an official appointee in the city school system, with the title of supervisor of health education.

The health education program in the public schools in New York will ultimately be guided by the special teachers of physical education. To this end five special teachers of physical education have been released from their motor-activities program to help in developing the larger health-education program. One of these teachers is assigned to the Bellevue-Yorkville Health Demonstration area. A special training course is being given to meet the needs of this group.

In order to encourage teachers in service to take courses in health education, the Board of Education has granted special privileges to certain teachers. From each school a maximum of three teachers is to be selected from those showing the most interest in health education. Each of these teachers is to be given the opportunity of taking sixty hours next year in health education. Then for the next four years they will be exempt from the regular thirty-hour annual study requirement for a salary increase. Cooperating with this plan Teachers College of Columbia University is offering two new courses in health education, one for teachers in

service and one for special teachers and supervisors, which will take up definitely the problems in health education in New York City schools.

In the early months of the health education activities of the Bellevue-Yorkville Health Demonstration, the two supervisors for the public and the Catholic schools worked directly with the classroom teachers. Now that there are 1,600 teachers and about as many classrooms under the influence of the demonstration's health education program, classroom visits in the public schools are made by the supervisory teachers, working with the supervisor. The health education supervisors are concentrating on group meetings and on preparing and assembling material for teacher's helps. Their object is to put at the elbow of each teacher authentic material from which she may select, adapt and create new ideas and better methods of teaching health.

As in the teaching of geography and arithmetic, lessons in health are graded to the pupil's capacity for understanding. Children in the lower grades hear little about health and being healthy, for they cannot grasp the meaning of such terms. Instead they learn about growing, and what aids growth. From day to day they can watch the growth of some plant or flower in a window-box at school and they can learn that plants need food, sunshine and air. They can consider some particular pet of their acquaintance and they can learn that the right food, sleep, rest, fresh air and sunshine are required for the growth of animals. Then it is easy for them to understand that what is true for plants and animals is also true for boys and girls.

The story that the school scales tell, the use of weight charts and reports, can be made very effective in teaching health habits, even in the lower grades. In the Bellevue-Yorkville district children who are ten per cent or more

underweight are weighed monthly and all children are weighed twice each term. A weight card, which tells what each child should weigh, and what he does weigh, is sent home twice a term for the parent's signature. This is a practical device for interesting parents in keeping their children up to approximately normal weight. Frequently the weight report brings parents to school to find out how their children can be brought up to normal weight, and the nurse or teacher then has an excellent opportunity to explain the importance of good food and the correction of defects, as well as other health habits which build weight and help growth.

A story about milk affords an opportunity for teaching spelling, language, oral reading and writing to a second grade class, as well as encouraging the milk-drinking habit. The children and teacher together work out a story to which various members of the class have contributed. The story may read like this:

The cow gives us milk.
The farmer milks the cow.
The milk is brought to the city.
We keep it covered, clean and cool.
Every boy and girl needs four cupfuls every day.
Milk makes our bones and teeth hard.
Milk helps us to grow.
We want to grow.
We shall drink milk every day.

After this story is written the class may decide to illustrate it in their art period, or the story may be written and illustrated on the blackboard, where it remains a happy influence toward increasing the school milk service.

The building of good-food charts is a device often used in the intermediate grades. The children bring from home pictures of vegetables, fruits, cereals, milk and other foods that



they eat during the week. Food values are discussed, and pictures of good foods are arranged and pasted on a large chart. The children may find out from their mother or from the grocer the price of each food, and for their arithmetic lesson they may compute the quantities needed and the costs for their families. For language and reading lessons they may write and read stories about food. As a geography lesson they may learn where the foods come from. In their physical training period they may play a game of good foods.

Dramatizations, poems, stories, rhymes, slogans, songs, and festivals are all devices that are used frequently in the classrooms in the Bellevue-Yorkville demonstration area to help the children to form good judgments about health and health habits. In one school a "Carnival of Winter" was developed as a health project in which the entire school participated. Supervisors, principals, teachers, pupils, and the departments of physical training, music, English, sewing and dramatics cooperated in producing the carnival, which was presented as a feature of the commencement day program.

The regular morning health inspection, which is a routine practice in all New York schools, has been elaborated somewhat in the schools in the demonstration area. To the inspection for cleanliness, care of teeth and symptoms of disease, the teachers add, "Have you had milk this morning?" and "Have you had a good breakfast?" Early in the school year the classes discuss what constitutes a good breakfast, and they decide that a good breakfast means fruit, a cereal, brown bread or toast, and milk or cocoa. Many teachers are developing interesting ways of recording the food habits of their pupils.

In all of the schools in the district nutrition work is emphasized, and in two public schools and one Catholic school intensive nutrition projects are under way, under the auspices of the nutrition service provided by the New York Association for Improving the Condition of the Poor. This project has been guided by a survey in the form of a questionnaire filled in by the pupils. Each month a letter is sent home to parents discussing some phase of nutrition, and the classroom follow-up emphasizes one point each month. One month, for example, a breakfast score sheet was kept daily until the teacher felt that the good breakfast habit had been firmly established. This breakfast score is shown on page 63.

Nutrition and good teeth, drinking milk, eating vegetables, having a yearly health examination, and securing the correction of physical defects were emphasized in succeeding months.

Dental projects have developed in a most satisfactory way in the demonstration area under the auspices of the dental service of the Association for Improving the Condition of the Poor. In those Catholic and public schools where the intensive dental projects are under way, the mouth of every child has been examined and charted. A squad of dentists

BREAKFAST SCORE SHEET

NAME _____ GRADE _____

SCHOOL _____ DATE _____

1. Did you eat dark cooked cereal
(as oatmeal)?

Or white cooked cereal (as
farina)?

2. Did you have milk on cereal?

3. Did you drink milk, plain or
in cocoa?

4. Did you have toast?

Or bread or rolls?

5. Did you drink coffee or tea?
(subtract)

Days: TOTAL

Weeks: TOTAL

POINTS	MON.	TUES.	WED.	THUR.	FRI.
20					
15					
30					
30					
20					
15					
15					

BELLEVUE-YORKVILLE HEALTH DEMONSTRATION

from the Oral Hygiene Committee of Greater New York gave their services free for these examinations. Each teacher and nurse was given a copy of the chart findings and both teachers and nurses are doing follow-up work, suggesting to parents that they have any dental defects of their children corrected by the family dentist.

In one public school where there are 2,200 children, 1,185 dental defects have been cleared up since last November. In one Catholic school where, of 594 children examined, only 84 were found with teeth in good condition, the number of children with teeth in good condition has been increased in four months to 219. By stimulating interest in dental hygiene

among the teachers, and by reserving a day for each school at the dental clinic at the Bellevue-Yorkville Health Center, a great many dental corrections have been made in all schools.

In two Catholic schools where there was no regular instruction in physical education, recreation programs have been introduced. Activities include imitative story plays, singing games and rhythmic games for younger children, low-organization games and posture exercises for primary groups, and folk dancing and team games for older girls. Printed instructions for games and classroom relief activities have been distributed weekly to the teachers in these schools.

On May 1, 1929, as a part of the Child Health Day observation, a health survey was made and an individual questionnaire was filled out by all public school pupils in the district in grades 4 to 8. In the lower grades, the teacher filled out the survey by noting the raising of hands to each question. Pupils were instructed not to sign their names to the individual questionnaires. These answers are being tabulated in the offices of the demonstration and future health work will be stressed in individual schools according to the needs shown by these questionnaires.

The demonstration proposes to use this same form annually on May first, for three or four successive years, in order to discover to what extent health habits may be improving under the health education program.

The questionnaire lists the following questions:

1. Do you sleep with bedroom window open?
2. Do you sleep at least 10 hours every night?
3. Are you up at 7 o'clock in the morning?
4. Do you drink at least 2 glasses of milk every day?
5. Do you eat breakfast every day?
6. Do you eat fruit for breakfast?

7. Do you eat a cereal for breakfast?
8. Do you drink coffee?
9. Do you drink tea?
10. Do you eat slowly and chew your food thoroughly?
11. Do you have a regular time every day to go to the toilet?
12. Is there a bathtub in your home?
13. Do you take a bath at least twice a week?
14. Do you have a toothbrush of your own?
15. Do you use it at least twice a day?
16. Have you any bad teeth?
17. Have you been to a dentist this year?
18. Do you have headaches often?
19. Do your eyes hurt often?
20. Can you read writing on the blackboard easily?
21. Can you hear easily what the teacher says?
22. Do you often take cold?

As the health education work in the Bellevue-Yorkville area takes firmer hold week by week and month by month, there are very definite marks of progress which may be noted by the interested observer. The school children are taking a greater interest in personal cleanliness, and an improvement is noted in their food habits. Better care of teeth and an increase in corrections of teeth defects are evident. Underweight children are climbing up toward the normal weight zone. The school milk service is increasing, and there is a gain in the correction of physical defects. Teachers and pupils alike are finding a happy approach to health work, and the teachers are assuming an interested responsibility for encouraging follow-up work and the correction of defects of children in their classrooms. The activities program which the schools are developing, based upon the needs and interests of the boys and girls, shows a very fine spirit of cooperation within the schools and throughout the area.

No mention has been made in this article of school medical inspection and nursing service, inasmuch as that is a separate story in itself. As a preliminary step toward ascertaining annually the health condition of school children in the Bellevue-Yorkville district, a study of the medical examination of third grade children in the public and Catholic schools was made in 1925-1926. A complete report of the findings of this study is published by the Bellevue-Yorkville Health Demonstration under the title, "Physical Defects in School Children, Bellevue-Yorkville District."



THE NEW YORK COMMISSION ON VENTILATION

By THOMAS J. DUFFIELD

Executive Secretary and Director of Field Studies



THE major interest of the New York Commission on Ventilation since its revival¹ in the autumn of 1926 has centered on a comparative study of methods of schoolroom ventilation, especially in the schools of the New York Health Demonstrations areas.

The ventilation study in the Cattaraugus County schools² started in December, 1926, and now in its third year, has been primarily a fact-finding survey of air conditions and methods of heating in one- and two-room rural schools of frame construction. Records of the prevalence of respiratory illness as judged by the teachers have been studied with regard to size of the school, method of heating, average classroom temperature, and outdoor weather conditions.

Two-thirds of the forty-eight classrooms were heated by ordinary stoves; one-sixth by jacketed stoves, and the remainder by furnaces. The furnace-heated classrooms had the highest average temperatures and the most uniform heat distribution both horizontally and vertically; the rooms with jacketed stoves were next, while the rooms with ordinary stoves had the lowest average and the greatest horizontal and vertical variations in temperature. Lateral variations in temperature as great as 42, 43 and 46 degrees between the temperatures on the tops of occupied desks in a stove-heated classroom have been found to exist simultaneously. Average differences between floor and ceiling temperatures ranged

¹The objectives of the Commission and the reasons for its revival are described in the Milbank Memorial Fund *Quarterly Bulletin*, July, 1927.

²A study of Rural School Ventilation, Contribution No. 2, New York Commission on Ventilation, *Public Health Reports*, United States Public Health Service (in process of publication).

from 12 to 34 degrees. One observation showed the ceiling temperature to be 55° higher than at the floor level.

The furnace-heated rooms had the lowest rates of absenteeism (12.9 per cent); the rooms heated by jacketed stoves, the highest (14.8 per cent), with the stove-heated rooms only slightly less (14.4 per cent). Whether these rates have any definite relationship to the type of heating or whether they are due to other factors or to chance alone cannot be determined on the basis of this experience.

In absenteeism reported due to respiratory illness, there were but slight differences according to method of heating, rooms heated by ordinary stoves having the lowest, and furnace-heated rooms the highest rate. The highest total incidence of respiratory illness was reported from the rooms heated with jacketed stoves, the furnace- and stove-heated rooms having practically identical rates. It was interesting to note that all these rates were two and three times as high as those previously observed in similar studies in Syracuse and New York City.

A high correlation between precipitation³ and absenteeism due to respiratory illness, was found while no apparent relationship was discovered between such illnesses and low temperatures. During inclement weather rural school children run greater risks of wetting their clothing than do city pupils because of the long distances they must travel and the poor transportation available and this is probably an important factor in the higher rates of absenteeism and respiratory illness found among them.

In the first year of the study in Syracuse also started December, 1926, old-furnace-heated, naturally-ventilated schools showed lower rates of absenteeism and lower rates of

³Public Health Reports, United States Public Health Service, op. cit.
Duffield, Thomas J., The Weather and the Common Cold, *Journal of American Public Health Association*, January, 1929.

respiratory illness than did modern steam-heated, mechanically ventilated schools attended by pupils of similar age, sex and racial composition.⁴ In the second year⁵ when the number of schools was doubled and nurses replaced teachers in making the records of respiratory illness, the old furnace-heated schools again showed the lowest rates of general absenteeism, but not the best records for respiratory illness.

A test showed that the personal equation of the various nurses was one of the most important factors in the number of cases of respiratory illness reported among the pupils present in school. Because of this influence, no comparisons on this point are warranted from the second year's study.

In Syracuse, as in Cattaraugus County, precipitation and the distance pupils have to travel to school appear to be important factors in absenteeism. In the first year's study, absenteeism due to respiratory illness was found to be closely correlated with precipitation—while there appeared to be no adverse effect from low temperature alone. This was particularly true of the modern schools with mechanical ventilation. When the relative travel distance of pupils attending the old and modern schools was studied, it was found that the average of the maximum distances pupils attending the former had to travel was 0.22 miles, while the figure for the latter was 0.40 miles. Thus pupils attending the larger, modern schools ran twice as great a risk of wetting shoes and clothing as those going to the little old furnace-heated schools, and this fact may account largely for the higher rates

⁴New York Commission on Ventilation. Relation between Respiratory Illness and Air Conditions in Certain Syracuse Schools, *School and Society*, xxvi, No. 67, December 17, 1927.

Duffield, Thomas J., Effects of Mechanical and Natural Ventilation on the Health of School Children, *Journal American Society Heating and Ventilating Engineers*, April, 1928, p. 327.

Duffield, Thomas J., The School Ventilation Study in Syracuse, New York, 1926-1927, *Journal of American Public Health Association*, March, 1928.

⁵Duffield, Thomas J., Report on the Schoolroom Ventilation Study, Syracuse, New York, *Journal of American Public Health Association*, January, 1929. p. 64.

of absenteeism and respiratory illness found in the modern schools, whether they have fan or window ventilation.

During 1928-1929 an effort has been made both in the studies in Syracuse and in the Bellevue-Yorkville district of New York City to overcome the difficulties experienced during the preceding year. In Syracuse, the effect of a single variable—the rate of air change—is being studied. Adjoining or adjacent classrooms in seven mechanically ventilated schools occupied by pupils of the same age, sex, racial origin, with the same distance to walk to school, et cetera, are supplied, respectively, with 30 and 10 cubic feet of air per pupil per minute. In two modern unit-ventilated schools in New York, similar conditions have been established. In the third school in the New York study, an effort is being made to determine which method of ventilation—the window-gravity method, as recommended by the former Commission, or the unit system of mechanical ventilation with air change at the rate of from 10 to 15 cubic feet of outdoor air per pupil per minute—is the more conducive to the pupils' health.

Investigations, similar in nature to the studies already described, under way in New Haven,⁶ Cleveland,⁷ and certain suburbs of Chicago,⁸ the last named being financed in part by the Commission, have been watched with interest.

The Commission has also made grants in aid of three laboratory studies:

- (a) *A Study of Body Radiation*, by L. B. Aldrich of the Smithsonian Institution under the direction of its secretary, Dr. Charles G. Abbot.

⁶Greenburg, Leonard, A Study of the Relationship Between Type of Ventilation and Respiratory Illness in Certain Schools of New Haven, Conn., *Public Health Reports*, lxiv, No. 6, February 8, 1929, p. 285.

⁷Childs, L. W., M.D., The School Ventilation Study in Cleveland, *Journal of American Public Health Association*, January, 1929, p. 59.

⁸Shaughnessy, Dr. H. J., The Relation Between Respiratory Disease Absenteeism and Ventilation in Some Suburbs of Chicago, presented at the School Ventilation Symposium, American Public Health Association Meeting, Chicago, 1928.

- (b) *A Study of the Effects of Drafts*, by Leonard Greenburg of the Yale School of Medicine under the direction of Professor C.-E. A. Winslow, and
- (c) *A Study of Atmospheric Ionization*, by Professor Earl B. Phelps, at the College of Physicians and Surgeons, Columbia University.

The study of the total heat output of the human body has interested many physiologists. Some, notably Rubner, have attempted to determine the rôles of the various methods of heat transfer in effecting this body heat loss. The Research Laboratory of the American Society of Heating and Ventilating Engineers interested in this matter since 1922, has very recently completed a study in which the importance of evaporation both from the skin and from the respiratory tract has been determined for a wide range of temperatures and humidities.⁹ Without a means of determining separately the amounts of heat loss by radiation and convection, they were forced to group these losses, although anyone who stops to consider the matter will realize that radiant heat losses are related to the surface temperatures and proximity of the surrounding bodies while convection is a function of the temperature and motion of the air.

In a recent article¹⁰ the writer raised the question of the importance of radiation losses from the pupils and the relation of such losses to the per capita floor space in the seating section of the average classroom. Correspondence with Dr. Charles G. Abbot, director of the Smithsonian Institution, regarding this question led to a study, which though by no means exhaustive, was referred to in the 1928 Annual Report of the Institution as a "novel, interesting and successful research on the cooling of the human body by radiation and

⁹Houghten, F. C., and others, Heat and Moisture Loss from the Human Body and Its Relation to Air Conditioning Problems, *Journal American Society Heating and Ventilating Engineers*. (In process of publication.)

¹⁰Duffield, Thomas J., A Preliminary Note on Radiant Body Heat and the School Ventilation Problem, *American School Board Journal*, July, 1927.

convection." A report of this study¹¹ recently published, shows that "at normal indoor temperature, in still air and with the subject normally clothed and at rest, body heat losses are distributed as follows: (a) evaporation of water, 24 per cent; (b) radiation, 46 per cent; and (c) convection, 30 per cent."

The fact that radiation is so large a factor in body heat loss suggests how important it is that this form of heat loss should not be interfered with and how necessary it is to have a knowledge of its importance through a wide range of temperatures, humidities, and under different rates of air motion.

No results are yet available from the study of the relation of drafts to respiratory illness for which a grant was made in the autumn of 1928. This research was an outcome of the 1926-1927 Syracuse study where the average temperatures of rooms in naturally ventilated schools were found to be somewhat higher than in those with mechanical ventilation. There was no perceptible difference in the relative humidities from the few observations made. It was assumed that the rates of air change were higher in the mechanically ventilated rooms and that this higher rate of air change involved higher velocities of air about the pupils, a condition that would make for a lower "effective temperature," which in combination with wet feet and clothing would promote evaporation of the water and result in chilling. It is hoped that this study may shed some light on this matter.

Until recently there has been no demonstrable difference between the air in mechanically-ventilated and window-ventilated schools, the chemical composition, the physical qualities and other conditions being equal, although individual observers held the opinion that the air of the mechan-

¹¹Aldrich, L. B., A Study of Body Radiation, *Smithsonian Miscellaneous Collections*, lxxxix, No. 6, December 1, 1928.

ically-ventilated school was "dead" whereas in the school with window ventilation it had life. It has been suggested¹² that the ionization of the atmospheric oxygen might differ under the two methods of ventilation and that this phenomenon might explain the suggestive differences that had puzzled previous investigators.

To make possible a study of atmospheric ionization the Commission has provided apparatus for the measurement of the electrical conductivity of air in the newly established Air Research Laboratory at the College of Physicians and Surgeons, Columbia University.

Another item, involving no laboratory investigations, but which, because it combined the results of earlier experiments both in the fields of thermodynamics and of human metabolism, may be included here, resulted in the determination of the amount of air at various temperatures required to offset the average heat output of the pupils.¹³ If the findings of Hermans, Flugge, Leonard Hill and the American Society of Heating and Ventilating Engineers that for periods of exposure up to two or three hours, comfort and physiological reactions of persons in closed rooms are associated with the combined effect of the physical properties of the atmosphere—its temperature, humidity and motion—rather than with its chemical composition, are properly applicable to repeated exposures of similar duration such as the pupils experience in attending school, then the school ventilation problem can be solved, in theory at least, by supplying the air of the chemical composition ordinarily found out of doors in such quantity, at such temperature and at such velocity as will exactly compensate for the sensible heat output of the pupils.

¹²Hartman, F. E., Has Air a Vital Property? *Journal American Society Heating and Ventilating Engineers*, February, 1926.

¹³Duffield, Thomas J., How Much Fresh Air Does the School Child Need? *Journal of the American Medical Association*, April 21, 1928.

The calculations indicate that during the greater part of the school year, it would be necessary to supply much smaller quantities of air than the "30 cubic foot" standard, provided the air can be introduced into the classroom at its outdoor temperature without causing drafts.

In addition to the publication of articles bearing on the Commission's work in school, health and engineering journals, a complete list of which may be obtained from the Commission's headquarters, the secretary has addressed school, health, and industrial groups and has consulted with school boards, ventilating engineers, architects and welfare agents on the subject of school, office and factory ventilation.

The Commission has made a collection of the laws dealing with the subject of school ventilation from all the states except North Carolina, from which the information does not appear to be available. Of the twenty-four states having in 1926 laws or regulations requiring 30 cubic feet of air per pupil per minute for at least certain of the schools within its boundaries, only one, Virginia, has modified its legislation so that window ventilation might be legalized. The Commission took no active part in this legislative change.

While the entire subject was under review, the Commission has not deemed it wise to undertake any aggressive campaign for the revision of existing legislation regulating the practice of school ventilation in the various states or municipalities. The Commission approved an article¹⁴ emphasizing the importance of maintaining certain air conditions in the classroom rather than the method of ventilation, but there is no evidence that this paper has had any effect on legislation existing at the time of its publication.

¹⁴Duffield, Thomas J., School Ventilation Laws, *Journal American Society Heating and Ventilating Engineers*, June, 1927, xxxiii, No. 6, p. 388.



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